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EXAMINER

STAHL, MICHAEL J

ART UNIT

PAPER NUMBER

2874

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/852,709

Applicant(s)

HEIKS ET AL.

Examiner

Mike Stahl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2003 and 24 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 20, 29-31, 40-47 and 50-53 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 7-18, 21-28, 32-39, 48, 49 and 54-58 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 11 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

This office action is in response to the amendments filed 11 March and 24 April 2003. The changes to the claims have been entered. Claims 1-18 and 20-58 are pending. The indication of allowable subject matter in claims 3-18, 20-24, and 26-28 in the last office action, in consideration of Witte (US 4325604), is withdrawn in view of the discovery of a relevant prior art reference (Cannon et al., US 4973127) which is newly applied below. However, it is noted that some of these claims continue to have allowable subject matter even in consideration of Cannon as explained below. The Office regrets any inconvenience this may bring to the applicant. This office action is not made final.

Information Disclosure Statement

The reference submitted 17 April 2003 has been considered. Since there is no citation form (PTO-1449) in the file, the examiner has listed the published version of the cited application (US 2003/0108272) on the attached PTO-892 form.

Drawings

The applicant-initiated proposed drawing correction submitted with the 11 March 2003 amendment is approved.

Claim Objections

Claim 2 is objected to because it fails to further limit claim 1. Applicant amended claim 1 to recite that the mounting apparatus comprises a plurality of mounting structures, although this change was not identified in the marked-up version of that claim. Claim 2 is therefore now redundant and should be canceled.

Claim 3 is objected to because in line 8, "along side" should be "along said".

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 50 and 51 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Claim 50 recites that the waveguide holding members each have at least one protrusion. There does not appear to be any support for this limitation. The substrate is described as having the protrusions (fibers, rails, spheres), which protrusions are engaged in grooves of the waveguide holding members. The waveguide holding members themselves do not have protrusions. Claim 51 is rejected by dependence from claim 50. This rejection will be withdrawn if applicant explains how claim 50 is supported by the original disclosure.

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The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 40-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 40 refers to "said substrate" but depends from claims 30 and 31, neither of which mentions any substrate. Claims 41 and 42 are rejected by dependence from claim 40. This rejection may be overcome by changing claim 40 to depend from claim 32.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 43-47 and 52-53 are rejected under 35 U.S.C. 102(b) as being anticipated by Heitmann et al. (US 5390266).

Heitmann discloses an optical switch assembly (fig. 1) comprising a first waveguide holding member 34 holding a first optical waveguide 20, the optical waveguide having an endface 24 which is angled such that an axial ray undergoes total internal reflection when the switch is open; a second waveguide holding member 40 holding a second optical waveguide 22, the waveguide having an endface 26 which is angled such that an axial ray undergoes total internal reflection when the switch is open; and a base 28 having a mounting structure (i.e. its

upper surface, or the groove located therein) onto which the first and second holding members are disposed so that a selected one of the waveguide holding members (e.g. 40) can be moved relative to the other one to accomplish switching.

As to claim 44, the endfaces of the first and second waveguides are mutually parallel.

As to claims 45 and 46, the selected waveguide holding member 40 is movable such that the respective waveguide endfaces are close enough for frustrated total internal reflection to occur, and is slidably disposed on the mounting structure at least by virtue of its attachment to fiber 22 which is slidably engaged in the groove on base 28.

As to claim 47, the optical axes of the waveguides are collinear.

As to claims 52 and 53, the path of movement can be either parallel or perpendicular to the optical axis of the first waveguide as indicated by the arrows in fig. 1.

Claims 1-6, 20, and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Cannon et al. (US 4973127).

Cannon discloses an optical switch assembly (figs. 1-3) comprising a fixed optical array 25; a movable array 25'; a plurality of first optical fibers f1-f12 mounted on the fixed array and a plurality of second fibers f1'-f12' mounted on the movable array; and a mounting apparatus comprising a plurality of mounting structures 45/45'. It is noted that the first array 25 may retain both mounting structures 45 and 45' (col. 3 lines 23-25), in which case the fixed array 25 would be immobile relative to the mounting apparatus 45/45'. When the fixed array 25 retains the pins, the other array 25' will be movable relative to the mounting apparatus along the optical axis of the fibers. Although Cannon does not describe a switching function per se (other than describing

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a make-or-break connection at col. 3 lines 25-28), it is noted that a switching operation is inherently achieved by connecting one plug **25** to the other plug **25'** since the signals from the fibers of a given plug either exit into free space or are coupled into the fibers of the other plug depending on the connection state of the plugs. Accordingly the Cannon arrangement is deemed to meet all the requirements of claim 1 (and claim 2 since it fails to limit claim 1 as noted above).

As to independent claim 3, in addition to the features described above with respect to claim 1, the Cannon fixed array **25** in one embodiment (see figs. 5-6) further comprises an upper chip **50b** mated to a lower chip **50a**, the chips including first grooves **60-71** which mate to receive the first fibers and cut-in portions which mate to create lateral notches between the upper and lower chips. The movable array **25'** has a structure which is identical to that of the fixed array **25**.

As to claim 4, the pins **45/45'** may be regarded as fibers (it is noted that claim 4 does not specify *optical* fibers).

As to independent claim 5, in addition to the structure described above, the Cannon arrangement further includes second grooves **80/81** in the fixed and movable optical arrays to receive the mounting structures **45/45'**.

As to claim 6, the mounting structures **45/45'** may be regarded as fibers as asserted above.

As to independent claim 20, the method of constructing the Cannon arrangement satisfies this claim in that the plugs **25'** and **25** constitute first and second support structures, the pins **45/45'** constitute mounting structures which together make up a mounting apparatus, the grooves

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80/81 on the first and second support structures are positioned on the mounting structures **45/45'**, and the second support structure **25** is fixed to the mounting apparatus.

As to claim 29, the first support structure **25'** is longitudinally movable in a direction parallel to the optical axes of its fibers.

As to independent claim 30, the Cannon arrangement as already described satisfies this claim in that the pins **45/45'** are interpreted as the mounting apparatus.

As to claim 31, the mounting apparatus includes a plurality of mounting structures **45** and **45'** which are in the form of fibers and which engage the second grooves **80/81** of the arrays.

Allowable Subject Matter

Claims 7-18, 21-28, 32-39, 48-49 and 54-58 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 40-42 stand rejected under 35 U.S.C. 112, second paragraph; however, if claim 40 is amended in the manner suggested above and if claim 32 is amended into proper independent form then claims 40-42 would be allowable by dependence from claim 32.

As to claim 7, the mounting apparatus in the Cannon arrangement does not involve any distinct substrate, and there is no teaching or suggestion in that reference to provide a substrate with the mounting apparatus. Claims 8-18 depend from claim 7.

As to claims 21, 23, and 27, the pins **45/45'** were interpreted as the mounting structures in the Cannon arrangement. Cannon does not disclose or suggest a separate base structure as

required by claims 21, 23, and 27. Claims 22, 24, and 28 depend from claims 21, 23, and 27 respectively.

Regarding claim 25, the cut-in portions in the Cannon arrangement (lateral grooves in figs. 5-6) are empty. There is no teaching or suggestion in Cannon to position fibers within these cut-in portions. Claim 26 depends from claim 25.

Claim 32 requires that the mounting apparatus comprises a substrate. This is not taught or suggested by Cannon as noted above with respect to claims 21, 23, and 27. Claims 33-39 depend from claim 32.

As to claim 48, Heitmann fails to disclose or suggest that the mounting structure includes a protrusion or that the holding members 34/40 include a groove to engage such a protrusion. Claim 49 depends from claim 48.

As to claim 54, the entire holding structure 32, which includes holding members 34/40, is made of quartz (col. 8 lines 39-42) and is disclosed as a single-piece member. There is no teaching or suggestion to make the holding structure from micromachined silicon and to make each holding member with a distinct chip. Claims 55-58 depend from claim 54.

Conclusion

The references made of record and not relied on are considered pertinent to applicant's disclosure: US 4725114 and US 5044711 disclose various groove/rail structures for aligning fiber arrays. US 6393174 and US 6519382 are not available as prior art but disclose optical switches relying on total internal reflection at opposed fiber endfaces similar to the present

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invention. US 2001/0041026 has an inventor in common with this application and discloses similar subject matter.

Any inquiry concerning this communication should be directed to Mike Stahl at (703) 305-1520. Official communications eligible for submission by facsimile may be faxed to (703) 308-7724 or (703) 308-7722. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at (703) 308-0956 or to the technical support staff supervisor at (703) 308-3072.

MJS

Michael J. Stahl
Patent Examiner
Art Unit 2874

22 July 2003


John D. Lee
Primary Examiner